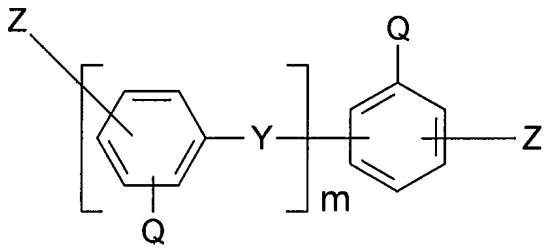
Claims:

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Previously Presented). A product comprising: a block copolymer for use as a solid polymer electrolyte, said block copolymer having at least first and second segments, the first segments being provided with acidic substituents for proton transport and the second segments having substantially no acidic substituents and serving for the mechanical integrity of the solid polymer electrolyte, and wherein said first segments have the general formula



in which:

Y represents – O –, – S –, – CO –, – SO_2 –, – $C(CH_3)_2$ –, – $C(CF_3)_2$ –, diphenyl methylene, diphenyl silicon, or fluorenyl,

end groups Z represent a halogen (F, Cl, Br, I), -NO_2 or – OH,

Q represents -SO_3H, – $SO_3^-M^+$, -COOH, – COO^-M^+, -PO_3H_2, – $PO_3H^-M^+$, or – $PO_3^{2-}2M^+$ where M is a metal such as Na or K,

with m being preferably between 5 and 200,

with the bridges Y between sequential aromatic rings when m > 1 being the same or different and being selected from any of the above atoms or groups listed for Y, and with Q not having to be present in every aromatic ring .

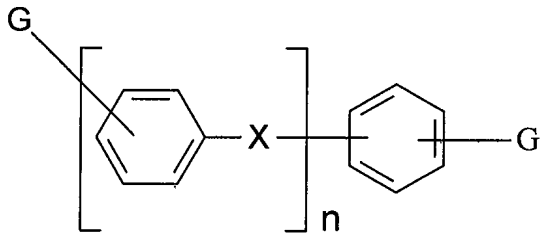
2. (Previously Presented). A product as set forth in claim 1, wherein said first segments are hydrophilic segments and said second segments are hydrophobic segments.

3. (Canceled).

4. (Canceled).

5. (Cancelled).

6. (Previously Presented). A product as set forth in claim 1, wherein said second segments have the general formula



in which:

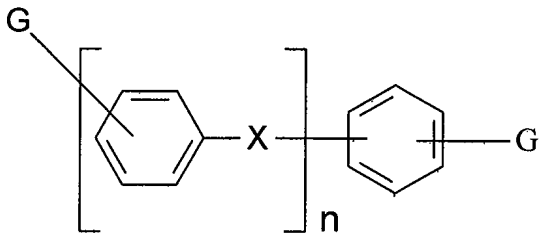
X represents – O –, – S –, – CO –, – SO_2 –, – $C(CH_3)_2$ –, – $C(CF_3)_2$ –, diphenyl methylene, diphenyl silicon, fluorenyl or a bond directly to the next aromatic ring,

the end groups G represent a halogen (F, Cl, Br, I), -NO_2 or – OH,

with the number of repeating units n of an aromatic ring constituting a second segment forming a hydrophobic block preferably lying in the range from 5 to 200, and

with the bridges X between sequential aromatic rings being the same or different and being selected from any of the above atoms or groups listed for X.

7. (Previously Presented). A product as set forth in claim 1, wherein said second segments have the general formula



in which:

X represents – O –, – S –, – CO –, – SO_2 –, – $C(CH_3)_2$ –, – $C(CF_3)_2$ –, diphenyl methylene, diphenyl silicon, fluorenyl or a bond directly to the next aromatic ring,

the end groups G represent a halogen (F, Cl, Br, I), -NO_2 or – OH,

with the number of repeating units n of an aromatic ring constituting a second segment forming a hydrophobic block preferably lying in the range from 5 to 200, and

with the bridges X between sequential aromatic rings being the same or different and being selected from any of the above atoms or groups listed for X.

8. (Previously Presented). A product as set forth in claim 1, wherein at least one additional segment is present of the same general composition as the aforesaid first segments, but with different atoms or groups Y or Q and with the atoms or groups Y being in any desired rational sequence.

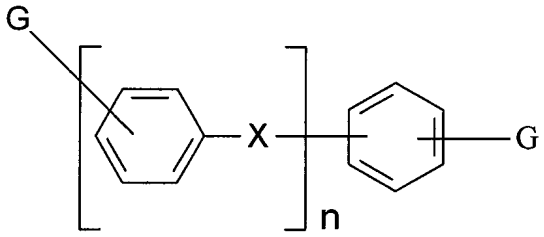
9. (Previously Presented). A product as set forth in claims 6, wherein at least one additional segment is present of the same general composition as the aforesaid second segments, but with different atoms or groups X and with the atoms or groups X being in any desired rational sequence.

10. (Previously Presented). A product as set forth in claim 6 wherein the membrane has a micro-phase separated morphology, for example in the form of spheres, cylinders or lamellae, or of ordered bi-continuous double diamond structures.

11. (Previously Presented). A product as set forth in claim 6 wherein the second segments have a molar mass from 5×10^2 to 5×10^5 (g/mol).

12. (Previously Presented). A product as set forth in claim 1, wherein said second segments are hydrophobic blocks substantially consisting of a main chain of aromatic rings or aromatic rings and bridging groups having no sulfonic acid groups in said main chain.

13. (Previously Presented). A product comprising: a block copolymer for use as a solid polymer electrolyte, said block copolymer having at least first and second segments, the first segments being provided with acidic substituents for proton transport and the second segments having substantially no acidic substituents and serving for the mechanical integrity of the solid polymer electrolyte, and wherein said second segments have the general formula



in which:

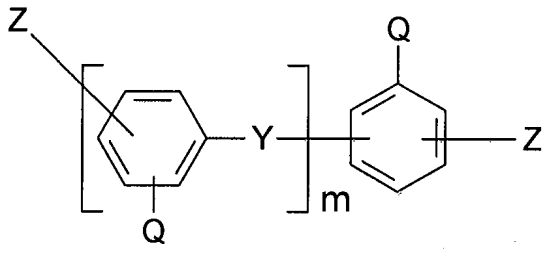
X represents – O –, – S –, – CO –, – SO_2 –, – $C(CH_3)_2$ –, – $C(CF_3)_2$ –, diphenyl methylene, diphenyl silicon, or fluorenyl,

the end groups G represent a halogen (F, Cl, Br, I), -NO_2 or – OH,

with the number of repeating units n of an aromatic ring constituting a second segment forming a hydrophobic block preferably lying in the range from 5 to 200, and

with the bridges X between sequential aromatic rings being the same or different and being selected from any of the above atoms or groups listed for X.

14. (Previously Presented). A product comprising: a block copolymer for use as a solid polymer electrolyte, said block copolymer having at least first and second segments, the first segments being provided with acidic substituents for proton transport and the second segments having substantially no acidic substituents and serving for the mechanical integrity of the solid polymer electrolyte, and wherein said first segments have the general formula



in which:

Y represents – O –, – S –, – CO –, – SO_2 –, – $C(CF_3)_2$ –, diphenyl silicon, or fluorenyl,

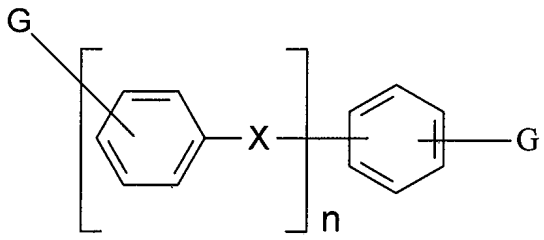
end groups Z represent a halogen (F, Cl, Br, I), -NO_2 or – OH,

Q represents -SO_3H, – $SO_3^-M^+$, -COOH, – COO^-M^+, -PO_3H_2, – $PO_3H^-M^+$, or – $PO_3^{2-}2M^+$ where M is a metal such as Na or K,

with m being preferably between 5 and 200,

with the bridges Y between sequential aromatic rings when m > 1 being the same or different and being selected from any of the above atoms or groups listed for Y, and with Q not having to be present in every aromatic ring.

15. (Previously Presented). A product as set forth in claim 14, wherein said second segments have the general formula



in which:

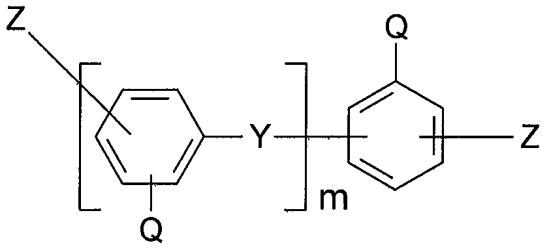
X represents – O –, – S –, – CO –, – SO_2 –, – $C(CH_3)_2$ –, – $C(CF_3)_2$ –, diphenyl methylene, diphenyl silicon, fluorenyl or a bond directly to the next aromatic ring,

the end groups G represent a halogen (F, Cl, Br, I), -NO_2 or – OH,

with the number of repeating units n of an aromatic ring constituting a second segment forming a hydrophobic block preferably lying in the range from 5 to 200, and

with the bridges X between sequential aromatic rings being the same or different and being selected from any of the above atoms or groups listed for X.

16. (Previously Presented). A product as set forth in claim 13, wherein said first segments have the general formula



in which:

Y represents – O –, – S –, – CO –, – SO_2 –, – $C(CH_3)_2$ –, – $C(CF_3)_2$ –, diphenyl methylene, diphenyl silicon, fluorenyl or a bond directly to the next aromatic ring,

end groups Z represent a halogen (F, Cl, Br, I), -NO_2 or – OH,

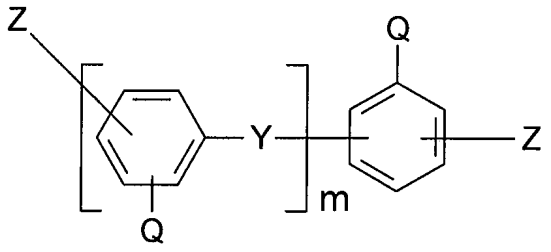
Q represents $-SO_3H$, $-SO_3^-M^+$, -COOH, $-COO^-M^+$, $-PO_3H_2$, $-PO_3H^-M^+$, or $-PO_3^{2-}2M^+$ where M is a metal such as Na or K,

with m being preferably between 5 and 200,

with the bridges Y between sequential aromatic rings when m > 1 being the same or different and being selected from any of the above atoms or groups listed for Y, and with Q not having to be present in every aromatic ring.

Claims 17-21. (Canceled).

22. (Previously Presented). A product as set forth in claim 25, wherein said first segments have the general formula



in which:

Y represents – O –, – S –, – CO –, $-SO_2-$, $-C(CH_3)_2-$, $-C(CF_3)_2-$, diphenyl methylene, diphenyl silicon, fluorenyl or a bond directly to the next aromatic ring,

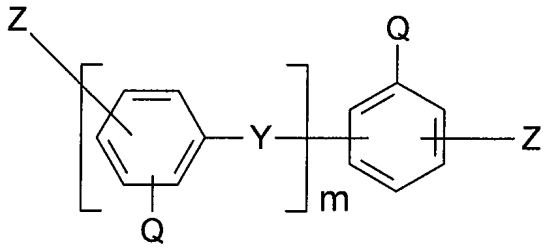
end groups Z represent a halogen (F, Cl, Br, I), $-NO_2$ or – OH,

Q represents $-SO_3H$, $-SO_3^-M^+$, -COOH, $-COO^-M^+$, $-PO_3H_2$, $-PO_3H^-M^+$, or $-PO_3^{2-}2M^+$ where M is a metal such as Na or K,

with m being preferably between 5 and 200,

with the bridges Y between sequential aromatic rings when m > 1 being the same or different and being selected from any of the above atoms or groups listed for Y, and with Q not having to be present in every aromatic ring.

23. (Previously Presented). A product as set forth in claim 27, wherein said first segments have the general formula



in which:

Y represents – O –, – S –, – CO –, – SO_2 –, – $C(CH_3)_2$ –, – $C(CF_3)_2$ –, diphenyl methylene, diphenyl silicon, fluorenyl or a bond directly to the next aromatic ring,

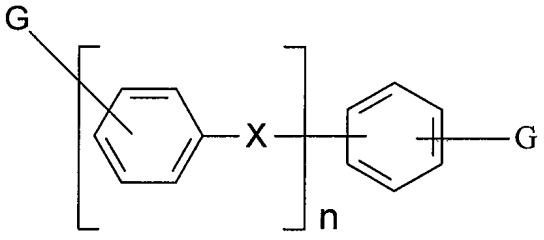
end groups Z represent a halogen (F, Cl, Br, I), -NO_2 or – OH,

Q represents -SO_3H, – $SO_3^-M^+$, -COOH, – COO^-M^+, -PO_3H_2, – $PO_3H^-M^+$, or – $PO_3^{2-}2M^+$ where M is a metal such as Na or K,

with m being preferably between 5 and 200,

with the bridges Y between sequential aromatic rings when m > 1 being the same or different and being selected from any of the above atoms or groups listed for Y, and with Q not having to be present in every aromatic ring.

24. (Previously Presented). A product as set forth in claim 26, wherein said second segments have the general formula



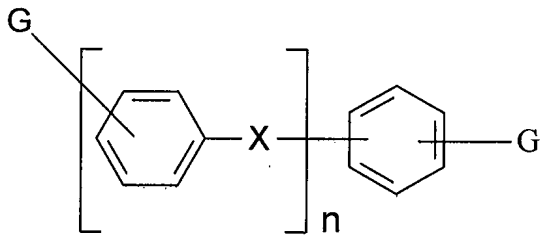
in which:

X represents – O –, – S –, – CO –, – SO_2 –, – $C(CH_3)_2$ –, – $C(CF_3)_2$ –, diphenyl methylene, diphenyl silicon, fluorenyl or a bond directly to the next aromatic ring,

the end groups G represent a halogen (F, Cl, Br, I), -NO_2 or – OH,
with the number of repeating units n of an aromatic ring constituting a second segment forming a hydrophobic block preferably lying in the range from 5 to 200, and

with the bridges X between sequential aromatic rings being the same or different and being selected from any of the above atoms or groups listed for X.

25. (Previously Presented). A product comprising: a block copolymer for use as a solid polymer electrolyte, said block copolymer having at least first and second segments, the first segments being provided with acidic substituents for proton transport and the second segments having substantially no acidic substituents and serving for the mechanical integrity of the solid polymer electrolyte, and wherein said second segments have the general formula

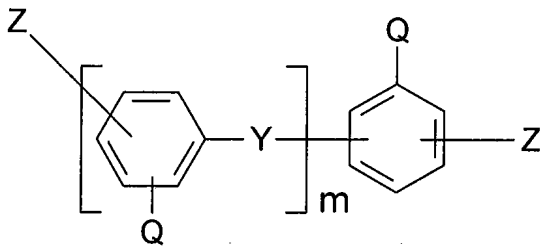


in which:

X represents – O –, – S –, – CO –, – SO_2 –, – $C(CF_3)_2$ – , diphenyl silicon, or fluorenyl,
the end groups G represent a halogen (F, Cl, Br, I), -NO_2 or – OH,
with the number of repeating units n of an aromatic ring constituting a second segment forming a hydrophobic block preferably lying in the range from 5 to 200, and

with the bridges X between sequential aromatic rings being the same or different and being selected from any of the above atoms or groups listed for X.

26. (Previously Presented). A product comprising: a block copolymer for use as a solid polymer electrolyte, said block copolymer having at least first and second segments, the first segments being provided with acidic substituents for proton transport and the second segments having substantially no acidic substituents and serving for the mechanical integrity of the solid polymer electrolyte, and wherein said first segments have the general formula



in which:

Y represents – O –, – S –, or – SO_2 –,

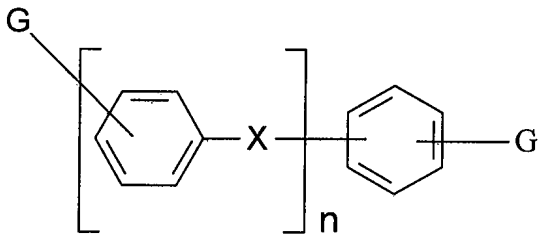
end groups Z represent a halogen (F, Cl, Br, I), -NO_2 or – OH,

Q represents -SO_3H, – $SO_3^-M^+$, -COOH, – COO^-M^+, -PO_3H_2, – $PO_3H^-M^+$, or – $PO_3^{2-}2M^+$ where M is a metal such as Na or K,

with m being preferably between 5 and 200,

with the bridges Y between sequential aromatic rings when m > 1 being the same or different and being selected from any of the above atoms or groups listed for Y, and with Q not having to be present in every aromatic ring.

27. (Previously Presented). A product comprising: a block copolymer for use as a solid polymer electrolyte, said block copolymer having at least first and second segments, the first segments being provided with acidic substituents for proton transport and the second segments having substantially no acidic substituents and serving for the mechanical integrity of the solid polymer electrolyte, and wherein said second segments have the general formula



in which:

X represents – O –, – S –, – CO –, – SO_2 –, – $C(CH_3)_2$ –, – $C(CF_3)_2$ –, diphenyl methylene, diphenyl silicon, fluorenyl or a bond directly to the next aromatic ring,

the end groups G represent a halogen (F, Cl, Br, I), -NO_2 or – OH,

with the number of repeating units n of an aromatic ring constituting a second segment forming a hydrophobic block preferably lying in the range from 5 to 200, and

with the bridges X between sequential aromatic rings being the same or different and being selected from any of the above atoms or groups listed for X.